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# 12th CBSE CHEM SET - 2 CODE 56/3/2

#### SECTION A

Questions no. 1 to 16 are Multiple Choice type Questions, carrying 1 mark  $16 \times 1 = 16$ each.

- Which of the following ligands can show linkage isomerism in a \_1. coordination compound?
  - (A) NH3

(C) NO2

- On adding AgNO3 solution to 1 mole of complex NiCl2 . 4NH3, two moles 2. of AgCl are formed. The secondary valency of Ni in the complex will be:

3

(A) 4 (B)

(C) 3 (D)

56/3/2-13

P.T.O.

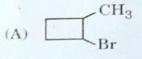
- 13. Transition elements form alloys easily because they have:
  - (A) same electronic configuration
  - (B) same enthalpies of atomisation
  - (C) same oxidation states
  - nearly the same atomic size (D)

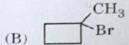
Consider the following reaction:

Br<sub>2</sub>, UV light

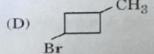


The major product obtained is:









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- Which one of the following compounds has the highest pKa value? p-Nitrophenol (A)
- m-Nitrophenol
- p-Cresol (C)

(B)

- 2,4,6-Trinitrophenol (D)
- $C_6H_5 O CH_3$  when treated with HI gives : 6.
  - $C_6H_5 I + CH_3 OH$ .(A)
  - (B)  $C_6H_5 OH + CH_3 I$
  - (C)  $C_6H_5 OH + CH_3 OH$
  - $C_6H_5 I + CH_3 I$ (D)

P.T.O.

- Which of the following compounds on treatment with benzene sulphonyl 7. choride forms product insoluble in alkali?
  - (A)  $(CH_3)_3N$
  - (B)  $(CH_3)_2NH$
  - (C) CH<sub>3</sub>CH<sub>2</sub>NH<sub>2</sub>
  - (D) C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>
- Which of the following amines gives carbylamine reaction?
  - (A) C2H5NH2
  - (B)  $(C_{2}H_{5})_{2}NH$
  - (C)  $(C_2H_5)_3N$
  - NH-CH<sub>3</sub> (D)

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- 'Night-Blindness' is caused by the deficiency of Vitamin: A.
  - (A) В

(B)

(C) K

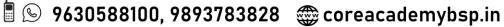
- (D) A
- A 1% solution of solute 'X' is isotonic with a 6% solution of sucrose (molar -10. mass = 342 g mol-1). The molar mass of solute 'X' is:
  - (A) 34·2 g mol<sup>-1</sup>
  - (B) 57 g mol<sup>-1</sup>
  - (C) 114 g mol<sup>-1</sup>
  - (D) 3.42 g mol<sup>-1</sup>
- When the initial concentration of a reactant is doubled in the reaction, 11. the half life period remains same. The order of reaction is:
  - (A) First



- (B) Second
- (C) Zero
- (D)
- Which of the following is a secondary cell? 12.
  - (A) Dry cell
  - Lead storage cell
  - Mercury cell (C)
  - Daniell cell (D)

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13. Assertion (A):  $\Delta_{mix}H$  and  $\Delta_{mix}V$  are zero for non-ideal solutions.



- Reason (R): Solute-solvent interactions are not same as pure solute-solute and pure solvent-solvent interactions in
  - non-ideal solutions.
- Assertion (A): Rate of reaction increases with increase in temperature. 14.



- Number of effective collisions increase with increase in Reason(R): temperature.
- Assertion (A): The boiling point of ethanol is higher than that of 15. dimethyl ether.



- Dimethyl ether molecules are associated through Reason(R): hydrogen bonding.



Assertion (A): Aniline undergoes Friedel-Crafts reaction. Aniline forms salt with AlCl3, the Lewis acid in Reason (R): Friedel-Crafts reaction.

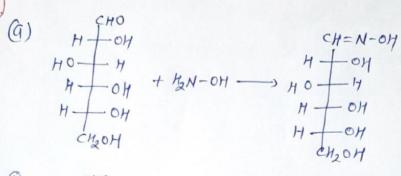
Write the reactions of glucose with:

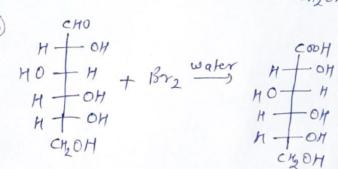


- $H_2N OH$
- (b) Br<sub>2</sub> water

16.

J. 17.





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Complete and balance the following chemical equations: 18.

 $2 \times 1 = 2$ 

 $KMnO_4 \xrightarrow{heat}$ 

 $2\mathrm{MnO}_4^- + 5\mathrm{C}_2\mathrm{O}_4^{2-} + 16\mathrm{H}^+ \longrightarrow$ 

18.

(9) 2 KMnO4 heat KgmnO4 + MnO2 + O2 Potassium Monganese manganate dionide Potassium Permanganate

(b) 2MnOy + 5 C204 + 16H+ -> 2 Mn2+ 10 CO2 + 840

Define molal depression constant. How is it related to enthalpy of fusion?

OR

What type of deviation is shown by ethanol and acetone mixture? (b) Give reason. What type of azeotropic mixture is formed by that deviation?

 $^{2}$ 

(19.) a Modal depression constant: The depression freezing point when one mole of the solute dissolved in 1000g of the solvent is called modal depression constant.  $K_f = \frac{R(T_f^2)^2 M}{\Delta F_{fis} \times 1000}$ 

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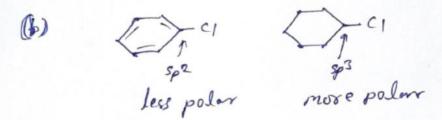
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19. (6) It show the deviation from Raoult's Lane It form minimum boiling azeotsopic mixture Reason: acetone break H-bond beth ele ethanols.

20. Which halogen compound in the following pair will react faster in S<sub>N</sub>1 reaction and why?

Why is the dipole moment of chlorobenzene lower than that of -(b)1+1=2cyclohexyl chloride?

20. (9) 3° > 2° > 1° for SM



- In a reaction, if the concentration of reactant 'X' is tripled, the rate of reaction becomes twenty-seven times. What is the order of the reaction?
  - State a condition under which a bimolecular reaction is kinetically -(b) 1+1=2a first-order reaction. Give an example of such a reaction.

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(B) 
$$CH_3-C''-0 GH_5+H_50 \longrightarrow CH_3-C''-0 H+GH_50 H$$

$$(Encess)$$

$$Rake = k [CH_3 CNOGH_5] [H_50]^{\circ}$$

$$Rake = k [CH_3 CNOGH_5]$$

$$\checkmark$$
 22. Give the structures of A, B and C in the following reactions:  $2\times$ 

$$2 \times 1\frac{1}{2} = 3$$

$$-\text{(a)} \qquad \text{CH}_3\text{CH}_2\text{Cl} \xrightarrow{\text{KCN}} \text{A} \xrightarrow{\text{LiAlH}_4} \text{B} \xrightarrow{\text{HNO}_2} \text{C}$$

$$(b) \qquad Fe/HCl \rightarrow A \xrightarrow{NaNO_2 + HCl} B \xrightarrow{C_6H_5OH} C$$

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How will you bring about the following conversions ? (any three)

3x1 = 3

- Benzoic acid to Benzaldehyde ✓ (a)
  - Ethanal to Propanone (b)
  - Acetophenone to Benzoic acid (c)
  - Bromobenzene to 1-Phenylethanol (d)



- (b) do it
- (c) do it
- (d) do it
- Write the reactions involved in the following: (a)
  - (i) Reimer-Tiemann reaction
  - (ii) Kolbe's reaction
  - Name the reagent used in the bromination of phenol to form -(b)2+1=3 2,4,6-Tribromophenol.

$$(i) \quad (i) \quad (i)$$

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A first-order reaction is 25% complete in 40 minutes. Calculate the value of rate constant. In what time will the reaction be 80% complete?

[Given:  $\log 2 = 0.30$ ,  $\log 3 = 0.48$ ,  $\log 4 = 0.60$ ,  $\log 5 = 0.69$ ]

(25) 
$$k = \frac{2.303}{t} \log \frac{A}{A} = \frac{2.303}{40} \log \frac{100}{75}$$

- What type of nucleophilic substitution  $(S_N 1 \ \text{or} \ S_N 2)$  occurs in the 26. (a) hydrolysis of 2-Bromobutane to form (±)-Butan-2-ol? Give reason.
  - What happens when chlorobenzene and methyl chloride are (b) treated with sodium metal in dry ether? 2+1=3

The conductivity of 0.2 M solution of KCl is  $2.48 \times 10^{-2} \, \mathrm{S \ cm}^{-1}$ . Calculate 27. its molar conductivity and degree of dissociation (  $\alpha$  ).

Given:

$$\lambda_{K^{+}}^{o} = 73.5 \text{ S cm}^{2} \text{ mol}^{-1}$$

$$\lambda_{\text{Cl}^-}^0 = 76.5 \text{ S cm}^2 \text{ mol}^{-1}$$

**USE KOHLRASCH LAW** 

A solution is prepared by dissolving 5 g of a non-volatile solute in 200 g of water. It has a vapour pressure of 31.84 mm Hg at 300 K. Calculate the molar mass of the solute.

(Vapour pressure of pure water at 300 K = 32 mm Hg)

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28.





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3

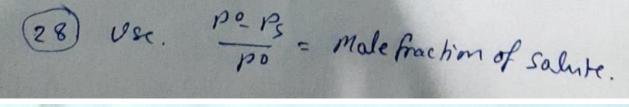






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29. Proteins are the most abundant biomolecules of the living system. Proteins are the polymers of about twenty different α-amino acids which are linked by peptide bonds. Ten amino acids are called essential amino acids. In zwitter ionic form, amino acids show amphoteric behaviour as they react both with acids and bases.

On the basis of their molecular shape, proteins are classified into two types: Fibrous and Globular proteins. Structure and shape of proteins can be studied at four different levels i.e., primary, secondary, tertiary and quaternary, each level being more complex than the previous one. The secondary or tertiary structure of proteins get disturbed on change of pH or temperature and they are not able to perform their functions. This is called denaturation of proteins.

Answer the following questions:

What are essential amino acids? 1(a)

1

What is meant by zwitter ionic form of amino acids? **レ**(b)

1

- Give one example each for Fibrous protein and Globular (i) (c) protein.
  - What type of linkages hold monomers of proteins together?  $2 \times I = 2$ (ii)

OR

- What is the structural feature which characterises a reducing (c) (i) sugar?
  - What is the structural difference between nucleoside and (ii) nucleotide?  $2 \times 1 = 2$

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- (9) which required in diet.
- (b) 0-2-CH-NH3
- (c) do it.

@@ Aldehyde or ketonic carbon free from glycosidic linkage. (ii) do it.

30. The involvement of (n-1)d electrons in the behaviour of transition elements impart certain distinct characteristics to these elements. Thus, in addition to variable oxidation states, they exhibit paramagnetic behaviour, catalytic properties and tendency for the formation of coloured ions. The transition metals react with a number of non-metals like oxygen, nitrogen and halogens. KMnO4 and K2Cr2O7 are common examples.

The two series of inner transition elements, lanthanoids and actinoids, constitute the f-block of the periodic table. In the lanthanoids, there is regular decrease in atomic size with increase in atomic number due to the imperfect shielding effect of 4f-orbital electrons which causes contraction.

Answer the following questions:

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1

2

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- Why do transition metals and their compounds act as good (a) catalysts?
- What is the cause of contraction in the atomic size of lanthanoids? 1 (b)
- Define lanthanoid contraction. How does it affect the atomic radii of V(c) the third transition series and the second transition series? 2

OR

In aqueous media, which is a stronger reducing agent -(c) Cr2+ or Fe2+ and why?

- (a) due to variable reglency.
  - (b) poor sherlding of 4f subshell e-.
  - (c) do it.

(c) In comparison to Re2+ and cr2+ cr2+ -> cr3+ ! Fe2+ -> Fe3+

d4 -> d3

more shable. More shable

'. cr2+ shronger reducing agent.

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#### 31. Attempt any five of the following:

 $5 \times 1 = 5$ 

Write the IUPAC name of the complex:

$$[Co(H_2O)(CN)(en)_2]^{2+}$$

- (b) Why is geometrical isomerism not possible in tetrahedral complexes having two different types of unidentate ligands coordinated with the central metal ion?
- Arrange the following complex ions in increasing order of their (c) crystal field splitting energy  $(\Delta_0)$ :

$$[Co(NH_3)_6]^{3+}$$
,  $[CoF_6]^{3-}$ ,  $[Co(CN)_6]^{3-}$ 

Write the hybridization and magnetic character of the complex (d)  $[Ni(CO)_4]$  on the basis of valence bond theory.

[Atomic No:: Ni = 28]

- Out of  $[CoF_6]^{3-}$  and  $[Co(C_2O_4)_3]^{3-}$ , which one complex is : (e)
  - more stable? (i)
  - the high spin complex? (ii)
- What is the difference between an ambidentate ligand and (f) bidentate ligand?
- Write the electronic configuration of d5 in terms of t2g and eg in an octahedral field when:
  - (i)  $\Delta_0 > P$ , and (ii)  $\Delta_0 < P$

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Calculate emf of the following cell at  $25^{\circ}\mathrm{C}$ :

 $Zn(s) | Zn^{2+}(0.001M) | | Cd^{2+}(0.1 M) | Cd(s)$ 

Given :  $E_{Zn^{2+}/Zn}^{0} = -0.76 \text{ V}, E_{Cd^{2+}/Cd}^{0} = -0.40 \text{ V} \text{ [log 10 = 1]}$ 

State Faraday's second law of electrolysis. How will the pH of aqueous NaCl solution be affected when it is electrolysed ? 3+2=5

OR

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Calculate the  $\Delta_r G^0$  and log  $K_c$  for the following cell reaction: (b) (i)

$$Fe(s) + Ag^{+}(aq) \rightleftharpoons Fe^{2+}(aq) + Ag(s)$$

Given: 
$$E_{Fe^{2+}/Fe}^{o} = -0.44 \text{ V}, E_{Ag^{+}/Ag}^{o} = +0.80 \text{ V},$$

$$1 \text{ F} = 96500 \text{ C mol}^{-1}$$

- Write any two advantages of the fuel cells over primary and (ii) secondary batteries?
- How many Faradays are required for the oxidation of 1 mole of H2O to O2? 3+1+1=5

(b) (c) 
$$\Delta G^{\circ} = -2.303 RT log Keq.$$

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Write the major product(s) in the following reactions:

(1) 
$$\bigcirc$$
  $\stackrel{\text{CH}_2\text{CH}_3}{\bigcirc} \xrightarrow{\text{a) KMnO}_4, \text{ KOH}} ?$ 

(2) 
$$CHO + CH_3 - C - CH_3 \xrightarrow{\text{dil NaOH}}$$
?

$$\begin{array}{c} \text{COOH} \\ & \\ \text{(3)} \end{array} \xrightarrow{\text{Br}_2 / \text{FeBr}_3} ?$$

Give simple chemical tests to distinguish between the (n) following pairs of compounds:

(1) 
$$COCH_3$$
 and  $COCH_2CH_3$ 

Pentanal and Pentan-3-one (2)

3+2=5

OR

- Give reasons for the following: (b) (i)
  - In semicarbazide, only one NH<sub>2</sub> group is involved in (1) the formation of semicarbazone.
  - Acetaldehyde is more reactive than acetone towards (2)addition of HCN.

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(ii) (1)Arrange the following in decreasing order of their acidic strength:

CH<sub>3</sub>COOH, O<sub>2</sub>N - CH<sub>2</sub> - COOH, HCOOH

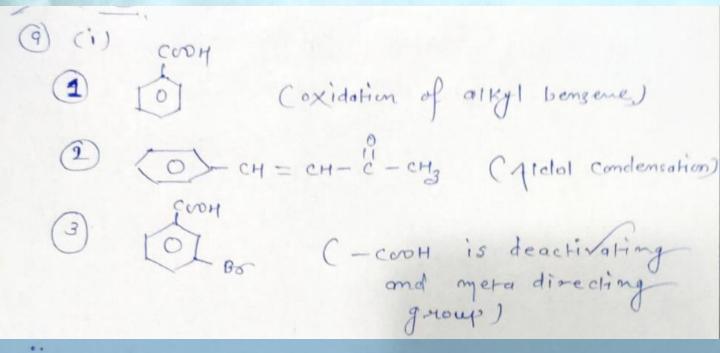
(2)Name the reagent in the following reaction:

$$CH_3 - CH = CH - CH_2 - CN \xrightarrow{?}$$

$$CH_3 - CH = CH - CH_2 - CHO$$

Write the reaction involved in Hell-Volhard-Zelinsky reaction.

2+2+1=5



- Haloform test
- Tollen's geagent

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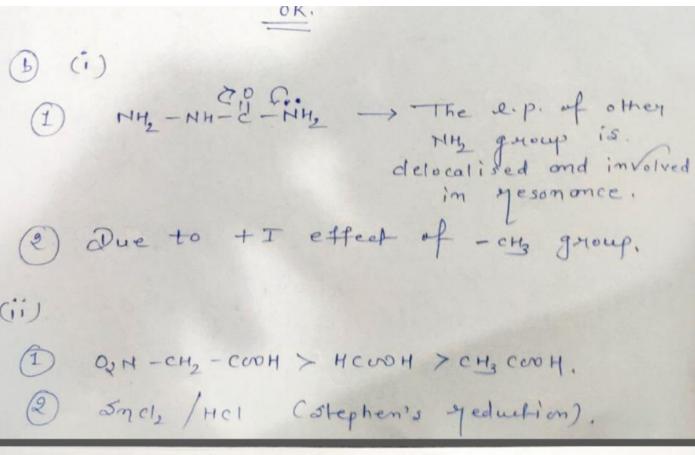






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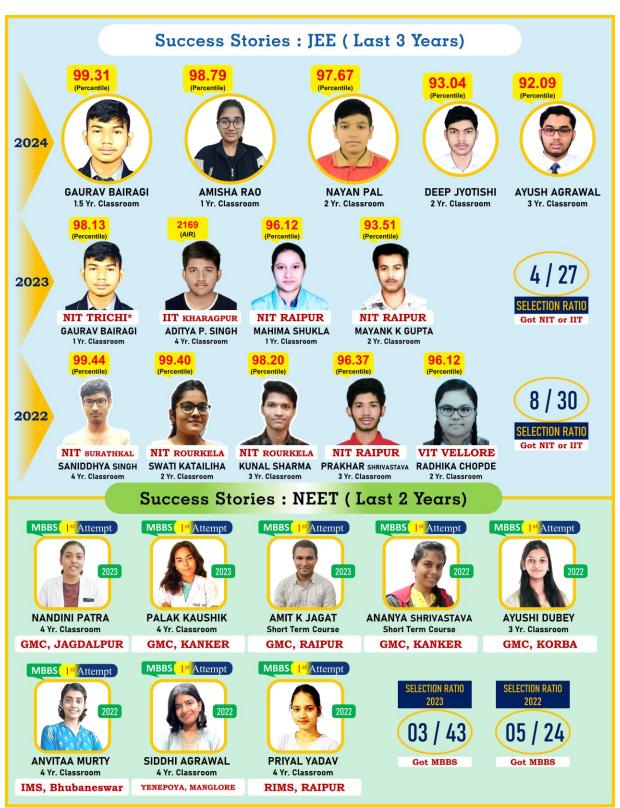
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